preliminary arrangements, and to secure the success of the observations, has detailed one of his officers, at present stationed in Upper Egypt, to check the latitudes of the French map where the eclipse track crosses the Nile. Indeed, he has done more than this, and here comes the dark side of the picture so far as the observers are concerned. The eclipse happens in the very midst of the Khamseen season—that is the period of fifty days during which Lower Egypt is apt to be swept by a hot, exhausting south-east wind, so dust-laden at times, that the sun is totally obscured. To escape the chances of this double eclipse, or at all events to minimise them, it will be necessary for the party to occupy high ground. Stone Pacha is, therefore, after consultation with our Consul-General in Egypt, prospecting for a camp and providing the necessary camp equipage, and although he himself will not, we believe, accompany the expedition, it is hoped that an officer of the Khedive's household, himself an adept in astronomy, which he has studied at both Paris and Washington, will accompany the expedition as guide, counsellor, and friend, to assist in making the necessary arrangements with the various local authorities. So much, then, by way of preliminary. Now, a word on the instruments to be employed on this occasion. The resources of modern science place many means of attack in the hands of the astronomer. To get an idea of the physics of the solar atmosphere—what it looks like—to study, so to speak, its circulatory system, to which such special attention has been recently directed by the bold hypothesis of Dr. Siemens—to investigate its extent, and to determine the luminosity of its various regions, we have the astronomical telescope, and, better even than this for some purposes, the photoheliograph, that is an instrument which enables us to obtain a photograph of all the sun's surroundings visible during the eclipse. To determine the chemical nature of the various regions, a question to which the keenest interest attaches at the present time, we have the spectroscope and the spectroscopic camera. By means of these instruments we can see what we cannot photograph, and photograph what we cannot see. In former eclipses, when the duration of totality has been longer, it has been possible to have different instruments mounted on different stands—there has been time to go from one to the other. But on this occasion such a course would be impossible. On one stand, therefore, we have four telescopes and two spectroscopes for eye observation. On another stand we have a photoheliograph and spectroscopic camera for photographic registration. In the observing telescope two spectroscopes are so arranged that a movement of the eye through two inches is all that is required to pass from the greatest spectroscopic dispersion (7 prisms of 60°) to the lowest (1 prism of 60°) which can be conveniently employed during an eclipse. In this way it is hoped that the spectrum of the brightest and the spectrum of almost the dimmest part of the sun's atmosphere can be observed, and for the first time in the history of eclipse observation, comparisons will be made with the solar spectrum itself, as a solar photograph taken before totality will be used as a scale. Much is hoped in the way of the photographic record, for since the last eclipse, the science of photography, following step by step the new views of molecular grouping suggested by the spectroscope, has provided us with silver salts, identical in chemical composition, but so different physically that the red part of the solar spectrum can now be recorded as satisfactorily as the blue part of the spectrum has ever been. Nor is this all. The rapidity with which an image can be impressed upon a sensitised plate has been enormously increased, so that if all goes well, seconds now take the place of minutes, and more can be recorded in five seconds now than was possible in five minutes twenty years ago.

We have no space in the present article to refer more precisely to the exact work which it is proposed to undertake, but this much may be said, that in eclipse, as in all other kinds of scientific observation, each attempt made to secure facts, instead of exhausting, increases the number of points of interest to be investigated, and now-a-days we not only get this principle at work from eclipse to eclipse, but daily work in our laboratories and physical observatories suggests questions which can only be solved at such times. Hence eclipse observations are getting more and more connected with terrestrial chemistry and terrestrial physics by this intermingling of laboratory and eclipse work, and hence also the area of general interest will be increased as time goes on.

In conclusion, we may state that the Government expedition will consist of Mr. Norman Lockyer, F.R.S., and Dr. Schuster, F.R.S., with their assistants, Messrs. Lawrance and Woods. Capt. Abney, who was at first detailed for the duty, is prevented by ill-health from joining the expedition, but the photographic preparations have been made under his supervision. It may be added that Mr. William Black and Mr. J. Y. Buchanan, late of H.M.S. *Challenger*, will accompany the expedition, and it is hoped that Prof. Tacchini may join it at Cairo. The *Kaisar-i-Hind* leaves Gravesend at 12.30 this day.

THE EDINBURGH FISHERIES EXHIBITION

THE International Fisheries Exhibition, which opened at Edinburgh on the 12th ult., and to which reference has been already made in the columns of NATURE, is likely to prove a complete success—not only commercially, but also as an exhibition of much that is interesting in the natural history of our most valuable marine animals.

The apparatus of capture takes up a large space inthe Waverley Market Hall, but no particular novelty in the way of fish-traps is shown; no artificial bait that would supersede the whelk or the mussel in the taking of cod has apparently been yet invented, although much required. Several models of improved rigs for fishing-boats are shown, but no improvement has apparently been effected on the ponderous beam trawl, which is much complained of as a cumbrous instrument of fish capture. The exhibition is rich in specimens of stuffed fish contributed by various bodies of London anglers—but why not label them? It is not given to every visitor to a fishery exposition to know a jack from a perch. Some of the late Mr. Buckland's finely modelled and correctly coloured fishes have been sent from Kensington—notably a model of a salmon captured in the Tay, which weighed, when taken, 72 lbs. Considering the importance of the salmon to Scotland as a rent-yielding fish, we had expected to find in the exhibition a methodical display of the progress of that mysterious disease which has of late overtaken that fish; but, beyond a drawing of an afflicted salmon, we saw no other indication of the calamity. The display of oysters in progress of growth from the *spat* to the stage of reproduction, although not large, is exceedingly interesting. We pass over, in the meantime, the merely commercial exhibits, of which of course there are many, and shall only say of the piscicultural exhibition, that it merits at our hands a much fuller notice than we have room to bestow on it at present. A large number of maps, charts, books, and engravings, bearing on the natural history of our food-fishes and the economy of the fisheries, may be seen and consulted in the exhibition hall, whilst the illustrations of river pollution and purification attract a large degree of attention. Despite the deficiencies at which we have hinted, the exhibition is a valuable one, and, although not all at once, may lead to some new departures in the art of fishing, which may tend to augment in a striking way the national commissariat.

Among the exhibits which have attracted special attention are those sent by Mr. Oscar Dickson, of Gothen-

burg, and the Swedish collection generally, and of these we give some notice below. They are exceedingly varied and, in addition to being of great scientific value, are also interesting to persons who have a monetary interest in our fisheries. Mr. Dickson's name is already familiar to the readers of NATURE, in connection with his well-timed support of various Arctic expeditions fitted out from Sweden, and along with his exhibit, or as we may say forming part of it, are two cabinets of preparations of marine animals brought home in the *Vega*, embracing spoils of the sea, obtained by Baron Nordenskjöld in his famous voyage of 1878-80. It is much to be regretted that a catalogue of this exhibit has not been prepared, or at any rate cannot yet be obtained, but a glance at the jars is almost sufficient to show us that there are numerous "finds" of great interest to zoologists. The collections made of worms and crustaceans, of crinoids, sponges, and holothuridæ are exceeding varied, and have been preserved with much care; they evince the activity of all concerned, particularly Dr. Julius Stuxberg, who was "lord of the dredge" in both of Nordenskjöld's Yenisei voyages. The work done with the dredge has already been chronicled in the account given of the voyage of the *Vega*, and it is to be regretted that, from the want of a catalogue, we are unable to do more at present than make this general reference to the collection, which shows us how rich in varied life are the depths of the sea in the high latitudes visited by the professor. A portion of the skeleton of the famous Steller's sea-cow (*Rhytina stelleri*) excites much attention. This animal, there can be little doubt, is now extinct; but when living, it must have been of large proportions, and not unlike a gigantic seal; it would probably be from 25 to 38 feet in length, and weigh 75 cwt., more or less. These remains are of signal importance, proving, as they do, what has been over and over again denied—the existence of a marine mammal of great size and power, herds of which used to browse on the fields of sea-weed.

As may be supposed, "the Swedish Collection" is rich in preparations of the herring: there are over seventy specimens of that fish (*Clupea harengus*), exhibiting its growth from the ova to its most complete stage—that of reproduction. The growth of the sprat (*C. sprattus*) is likewise illustrated in a series of twenty-four preparations, which are of singular interest, so many persons believing that the latter fish is simply a young herring. It is certainly a curious circumstance that the two fish are frequently caught in the same nets, but upon being handled a difference is at once felt, although when taken, both fish are of the same size. The sprat can be at once distinguished from the young herring by means of its strongly serrated abdomen, and when closely examined, it presents several other differences alike of colour and form. A few preparations to show the growth of the pilchard (*C. pilchardus*) are also contained in the Swedish collection. Although the fisheries of Sweden are not of so much value as those of some other countries, great pains have been taken by those in charge of them to teach their fishermen how to make the most of what they have access to—hence the careful preparations of the herring. On the Cattegat an important fishery has been organised, but taken as a whole the total value of the Swedish fisheries is not more than 400,000*l.* per annum. But the Swedish fishermen, not content with the produce of their own waters, venture to the west coast of Norway and the west coast of Jutland, and find it to their interest to do so. Their chief fishing industry when at home, excepting their labours on the coast, consists in capturing the small Baltic herring, which they accomplish by means of seine nets, of good material, and very well made. The industry of herring catching, according to Mr. Oscar Dickson, is of great antiquity in Sweden, and the product of the shoals at particular times, has been of far greater value than the figures we have quoted above serve to indicate. From time to time the fishermen have been cheered by the advent of great bodies of herrings, and at one period, the take in some years, amounted to between two and three million barrels of eight cubic feet each per annum. The catch of herrings last year, the statistics of which have not yet been prepared, is said to have been "positively enormous." It is somewhat remarkable, however, that the figures of the Swedish herring fishery, which were circulated at the Berlin Exhibition of 1880, on the authority of Dr. Lundberg, do not correspond with those for which we are indebted to Mr. Oscar Dickson; according to Lundberg the herring-fisheries of Sweden are of the value of 5,000,000 *marks* annually, but the "millions" of barrels indicated by Mr. Oscar Dickson mean "millions" of *pounds* (not *shillings*) sterling. It is to be hoped this discrepancy of figures will be explained.

Besides these herring exhibits, there is much that is worthy of notice in the Swedish collection. There is, for instance, a display of the eggs of birds which prey on fish. This selection is from the prolific store of Mr. Ramberg, whose collection at Gothenburg is of world-wide celebrity. Some of the eggs which are shown are those of very rare birds. The development and growth of one of our flat fishes (*Rhombus lævis*) is exemplified in all stages of growth, some of which are singular, as, for instance, the changing of the eye in the flounder from one side of its head to the other. We hope Mr. Oscar Dickson's contributions and those from the Gothenburg Museum will be shown in London next year, and that Dr. A. W. Malm will again be in charge of the whole of the Swedish collection, which would require a much larger amount of space for its description than we have at present to bestow.

One of the most interesting of the exhibits shown in the Fisheries Exhibition is Sir John Graham Dalzell's smooth sea-anemone (*Actinia mesembryanthemum*), which is familiarly known as "Granny." It was taken from a rock pool at North Berwick, on the Firth of Forth, so long ago as August, 1828, and was then placed in the glass jar in which it is now exhibited. At that time it was thought it might be seven or eight years old, and its age at present may be over sixty years. During a period of twenty years "Granny" produced 334 young ones. In 1851, after the death of Sir John, who, according to the article "Aquarium," in the "Encyclopædia Britannica," was a keen student of marine animals, several of which could always be seen at his house in a humble kind of aquarium, this anemone was placed in the possession of the late Prof. John Fleming, and was carefully tended by him so long as he lived. Shortly before the death of the Professor, which took place in November, 1857, "Granny" unexpectedly gave birth, during a single night, to 240 living young actiniæ. Dr. James McBain, R.N., who took a warm interest in zoological affairs, was the next custodian of the smooth sea-anemone, which was presented to him by the widow of Prof. Fleming; it remained in his custody until a few days before his death in March, 1879, when he presented it for safe keeping to Mr. John Sadler, curator of the Royal Botanic Gardens in Edinburgh. In the glass jar, along with "Granny" three out of seven young ones are shown, born on February 18 last. As may be supposed, with such an interesting biographical record, Sir John Graham Dalzell's smooth sea-anemone is a decided feature among the "exhibits." Sir John was the author of "Rare and Remarkable Animals of Scotland," as well as numerous other works now forgotten.

NOTES

SIR H. COLE, K.C.B., late director of the South Kensington Museum and Inspector-General of the Science and Art Department, died on Tuesday night at his residence, Philbeach Gardens,